Emergency seed funding for COVID-19 research: lessons from Johns Hopkins University

Julie Messersmith,[1] Chasmine Stoddart-Osumah,[1] Marc Lennon,[1] and Denis Wirtz[1,2,3]

[1]Office of the Provost, Johns Hopkins University, Baltimore, Maryland, USA. [2]Department of Chemical and Biomolecular Engineering, Whiting School of Engineering, Johns Hopkins University, Baltimore, Maryland, USA. [3]Sidney Kimmel Comprehensive Cancer Center, and Department of Pathology, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA.

Seed grant programs are an efficient mechanism for universities to invest in high-risk ideas, encourage collaborative research, support early-career faculty, and direct faculty toward a specific goal. When deployed effectively, they can lead to a strong return on investment for the institution and grantees including scientific achievements, extramural grants, in-kind support, publications, presentations, and intellectual property (1–3). The Johns Hopkins University Office of the Vice Provost for Research (OVPR) has six years of experience managing the Catalyst Awards and the Discovery Awards, a combined $30 million initiative to support early-career faculty and collaborative teams from every division and field within the institution. The programs are the largest centralized and internally funded seed grants in the United States. At the outset of the COVID-19 pandemic, Johns Hopkins leadership quickly mobilized to support research teams as they pivoted to gather preliminary data and seek solutions to save lives. The administrative processes established for the Catalyst and Discovery Awards enabled rapid facilitation of a new $6.4 million COVID-19 emergency seed grant program in March 2020 called the JHU COVID-19 Research Response Program. Six months into the program, there had already been significant progress across several categories, including $59 million received in extramural funding. Here we discuss key lessons learned from the program.

Seed grant deployment

The JHU COVID-19 Research Response Program was launched in March 2020 as an ambitious, wide-ranging research effort to tackle the many challenges presented by COVID-19, including research projects designed to enhance our understanding of the virus, track and prevent its spread, and improve treatment. The program's intention was to spark the formation of new teams and seed innovative projects with flexible funding on a timeline that might not have been possible with external sources; further, the preliminary results would prepare these teams for large-scale federal grants. The Office of the President provided the biggest share, with additional funds contributed by six schools/divisions and a Trustee of Johns Hopkins University.

An oversight committee of research leadership was assembled, and nine program areas were identified in the pursuit of five goals: understanding the biology of SARS-CoV-2, mitigating transmission, identifying clinical features of COVID-19, prevention and treatment, and developing new ways to protect health care workers and solve supply chain issues (Figure 1). A biospecimen repository was also established.

Faculty leaders were selected based on their expertise in the area, their leadership experience, and proven ability to be efficient and inclusive conveners. These program area leaders crafted proposals for pilot projects. The oversight committee was essential for devising the COVID-19 research priorities and appointing program area leaders based on their institutional knowledge and relationships with faculty across their schools. Funded projects spanned several areas, including computational, biological, medical, mechanical, modeling, and patient safety studies, and teams were generally funded on four- to six-month timelines. From the beginning of the pandemic, faculty pursuing COVID-19 research were exempted from the research ramp-down while practicing appropriate safety protocols including masking, social distancing, reduced lab density, and remote work (4). When the campuses began to reopen on June 15 for on-site research, these teams provided valuable insight into best practices, challenges, and effective messaging for operating in this new work environment (5).

The JHU COVID-19 Research Response Program is engaging about 260 clinicians, faculty, research staff, postdoctoral fellows, and graduate students working on 29 projects set to achieve ambitious goals on immediate timescales. Of the 49 program and project leaders, 39% are female, 8% are from underrepresented racial and ethnic groups (6), 20% are assistant professors, 29% are associate professors, 45% are professors, and 6% are scientific staff. Further, these leaders represented 27 departments across seven divisions of the institution; 43% hold a primary appointment in the School of Medicine. The projects also continue to provide the framework and resources — including sequencing and metadata pipelines, reagents, assays, and samples — necessary to enable further COVID-19 research at Johns Hopkins.

Accomplishments and lessons learned

The Johns Hopkins University's investment in its people and their projects has already led to an impressive return. Of the $6.4 million total, the committee has distributed $6.1 million in seed grants that have resulted in $59 million in sponsored funds from twelve unique sponsors, a 10:1 return on investment. Notable grants were awarded by the National Institutes of Health, Department of Defense, and biotech companies.

Above all, the quality and rigor of COVID-19 research is consistent with the high standards expected of Johns Hopkins

Conflict of interest: DW is the co-founder and co-owner of AbMeta Therapeutics, Inc. He holds US patent number US20160256404A1.

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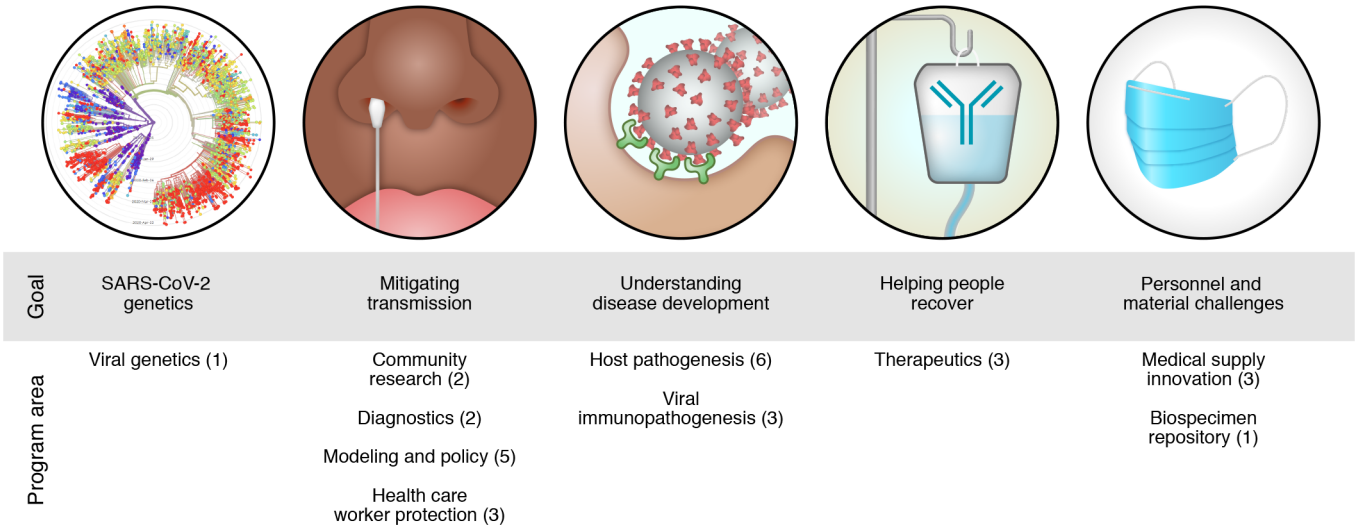

Figure 1. JHU COVID-19 Research Response Program. The JHU COVID-19 Research Response Program was deployed in March 2020 with $6.4 million in flexible funding to support new research teams. An oversight committee established nine program areas and a biospecimen repository in pursuit of five broad goals. Research teams launched 29 projects within these areas; the number of projects funded per area is indicated in parentheses.

University. There have been several major accomplishments, including understanding viral spread in the National Capital Region through genomic sequencing (7); deploying a survey to understand adoption of nonpharmaceutical interventions in Maryland across diverse populations (8); revealing obesity as a risk factor for cases of advanced disease (9, 10); establishing age, disease severity, and sex as drivers of short-term antibody responses (11); discovering that patients who recovered from mild or severe COVID-19 disease showed evidence of durable B cell–mediated immunity against SARS-CoV-2 (12); and launching the National COVID-19 Convalescent Plasma Project to treat tens of thousands of patients with convalescent plasma (13).

Factors underlying program impact

Several aspects of this program's design supported its success. First, it was important to provide flexible funds for research teams to coalesce and gather preliminary data prior to the availability of large-scale external grants. Grants ranged from $10,000 to $950,000. Second, with a central perspective across the institution, the oversight committee defined the research response around problems and knowledge gaps rather than specific fields or departments. Third, the bench-to-bedside pipeline was connected; researchers with nonclinical backgrounds were directly connected to the clinicians caring for COVID-19 patients. Fourth, frequent discussions guided the course of several studies and provided real-time insights as understanding of the disease quickly evolved. Fifth, research teams were encouraged to focus on four- to six-month timelines, but no-cost extensions were allowed if necessary. Sixth, robust support was provided to teams for external grant submissions through the university's Research Development Team, which provides specialized service to assist project teams with large-scale proposals.

A prevailing challenge experienced by the teams — from wet labs to clinical research — was the identification of staff for redeployment and rapid reassignment. Understandably, these teams needed to move at record pace to have the most impact and this pandemic exposed an opportunity to systematize these skill and opportunity matches for program managers and research coordinators. Research coordinators with experience managing clinical studies were in especially high demand for COVID-19–related projects. Fortunately, human resources developed a staff redeployment module within the university's recruiting system. There were some instances when existing review processes struggled to keep pace with an increased pandemic-related workload, resulting in delays for some of the projects. In some cases, additional layers of oversight were created to triage COVID-19–related requests but these proved ineffective at expediting decisions and added a further review step. The institution has generally been good at bringing broad representation together through these processes but we recognize a need to further enhance efficiency and improve flexibility. Overall, increased communication among the divisional research leaders enabled collaborative discussion and faster resolution for these and other issues.

Conclusion

Throughout the COVID-19 pandemic, elevated levels of collegiality and collaboration have been on display by the research community, both within Johns Hopkins University and the School of Medicine and with collaborators in other institutions. This pandemic demonstrated that centralized seed grant programs are critical in moments when sponsored funding is not yet available, but the problem demands immediate investigation. With proper selection and management, these investments have the potential to encourage new partnerships, meaningfully support faculty in their research, and attract significant sponsored funds. These programs can also provide unique mentoring opportunities, improve communication across large universities, and ensure roadblocks are elevated for resolution.

Institutions should consider implementing emergency seed grant programs as an engine of scientific progress.

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Address correspondence to: Julie Messersmith, 3400 N. Charles Street, 382 Garland Hall, Baltimore, Maryland 21218, USA. Phone: 410.516.2825; Email: jmesser5@jhu.edu.

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